

A Descriptive Study of Papillary Thyroid Carcinoma in a Teaching Hospital in Chennai, India

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OBJECTIVE: In the 1994 Chennai population-based cancer registry, thyroid carcinoma constituted 1% and 2% of all incident cancers among males and females, respectively. The aim of our study was to conduct an epidemiological survey of the pattern of papillary thyroid carcinoma in the Chennai Government General Hospital and the Chennai Cancer Institute.

METHODS: Our data base included a total of 264 (58 males and 206 females) consecutive cases of papillary thyroid carcinoma admitted to the Government General Hospital and 164 (42 males and 122 females) cases from the Chennai Cancer Institute.

RESULTS: There was a female preponderance (100 males and 328 females) ($p < 0.001$). The median age at diagnosis was 39 years among males and 32 years among females. The distribution of cases by residential area lay scattered from < 1 km to > 100 km, with the majority (28%) from the city of Chennai and its suburbs in the Government General Hospital, while 52% of the cases in the cancer institute were from the neighbouring state. Iodine intake was present in 75% of cases ($p < 0.001$). The diagnosis of thyroid cancer was confirmed by fine needle aspiration cytology in most (88%) of the cases. The extent of disease in the Government General Hospital and the Cancer Institute were as follows: localized in 66% vs 32%; spread to surrounding structure with or without nodal involvement in 26% and 59% presence of only secondary nodal involvement in 3% and 1%, distant metastasis in 5% and 8%, respectively. The primary modality of treatment was surgery with total thyroidectomy being performed in 82%, while the rest underwent a hemithyroidectomy.

CONCLUSION: The cumulative life-time risk of thyroid cancer in Chennai was one in 970 in males and one in 565 in females. High dietary intake of iodine was the most significant risk factor for the etiology of papillary thyroid carcinoma in our study. (*Asian J Surg* 2002;25(4):300–3)

INTRODUCTION

Thyroid carcinoma constituted 1% and 2% of all incident cancers among males and females, respectively, during the 1994–98 Chennai population-based cancer

registry. Papillary carcinoma was the most common histological variant. Papillary thyroid carcinoma has been classified as a well-differentiated thyroid cancer, together with follicular thyroid cancer, because of its good prognosis and low mortality rate.

PATIENTS AND METHODS

Between January 1994 and December 1998, 264 patients with papillary thyroid carcinoma who were admitted and treated in various general surgical units in the Government General Hospital (GGH), together with 164 patients from the Cancer Institute in Adyar, were included in this retrospective study. Prior to surgery, a

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detailed medical history was obtained from all patients and a complete physical examination was made.

All patients underwent complete radiological examination comprising chest radiography, cervical ultrasonography, (computed tomography [CT] in certain selected cases) and fine needle aspiration of thyroid nodules or cervical adenopathy at the time of admission. Surgeries were performed depending on the cytological results and extent of lesions.

The main focus of analysis in this study was directed towards the age and sex incidence of disease presentation, the various clinicopathological presentations and the distribution of cases in both coastal and inland regions.

RESULTS

Of a total of 428 patients who were admitted to both the GGH and the Cancer institute, the distribution of cases by residential area lay scattered from < 1 km to >100 km from Chennai. The majority of patients (334) were < 60 km from the shore and the remaining 94 were from inland areas.

The patients reviewed in our study belonged to all age groups, the youngest being 10 years of age and oldest being 74 (Table 1). Among males, the median age at diagnosis was 39 years (range, 26 to 74 years) and 32 years among females (range, 10 to 70 years). They hailed

from different demographic and highly variable socio-economic backgrounds. Among those incident cases registered in GGH, there was a history of thyroid carcinoma in first degree relatives of four patients (1.5%).

A definitive diagnosis of papillary carcinoma was established in 378 patients. Fine needle aspiration cytology (FNAC) at the time of presentation contributed to a diagnosis in 363 patients (85%). Radioactive iodine uptake was done in some cases and FNAC repeated from cold or suspicious nodules, thus enhancing the diagnostic accuracy. Ultrasound guided FNAC also enhanced the sensitivity.

CT of the neck was done to assess the extent of local invasion, tracheal compression and patency of the major blood vessels of the neck. In most of the patients treated at GGH, 175 (66%) had disease localized to the gland compared to 57 (32%) of patients with localized disease treated at the Cancer Institute in Adayar. CT allowed detection of local invasion and nodal metastatic disease in 69 patients (26%) from GGH and 97 patients (59%) at the Cancer Institute. This was followed by a staging workup in each patient, which allowed detection of metastatic disease in 21 patients (6.07%), nine of whom had evidence of nodal enlargement but no palpable thyroid swelling or nodule (Table 2).

In GGH the classic variant of papillary carcinoma was the most common morphological type (83%) followed by the follicular variant (9%), tall-cell (6%), columnar-cell and diffuse-sclerosing variants (1%) each (Table 3).

Of the 428 patients, 352 underwent total thyroidectomy, with or without neck nodal dissection depending on the stage of disease. Hemithyroidectomy was performed in 76 patients. FNAC was inconclusive in most cases. Peri-operatively, every precaution was taken to identify and preserve the recurrent laryngeal nerve (RLN). It was noted that in four patients who had a clinically detectable voice change, the RLN had been infiltrated by

Table 1. Patient characteristics

Age at diagnosis	Number	Percentage
0–20	21	4.9%
21–40	264	61.6%
41–60	193	24.1%
> 60	40	9.4%

Table 2. Clinical presentation (n = 428)

Presentation	Number	
	Government General Hospital	Cancer Institute
Thyroid swelling	175	57
Thyroid swelling with nodal disease	69	97
Occult carcinoma (cervical lymphadenopathy)	7	2
Distant metastasis	13	8

Table 3. Papillary carcinoma – histological variants in the Government General hospital, 1994–1998

Histological variant	No. of cases (%)
Classical type	220 (84%)
Follicular	25 (9%)
Tall cell	15 (6%)
Columnar cell	2 (1%)
Diffuse sclerosing	2 (1%)

the tumour. In these cases, the RLN had to be sacrificed. In order to avoid postoperative hypocalcaemia the parathyroid glands were identified during surgery in every case and their blood supply preserved. In two cases where the glands were inadvertently removed, they were promptly replaced in the forearm.

Postoperative thyroxine 0.3mg/day was administered to all patients. In order to detect recurrence on follow-up, patients were instructed to stop thyroxine for a period of 4 to 6 weeks, during which time the level of TSH rose. Administration of radioiodine after this interval led to the rapid uptake of this substance, in the presence of recurrence. By this method, recurrence was detected in 49 of the total 428 patients who had undergone both total thyroidectomy and hemithyroidectomy.

DISCUSSION

Carcinoma of the thyroid gland continues to be the commonest endocrine malignancy,¹ the papillary form accounting for more than 70% of these malignancies worldwide. The incidence of clinically diagnosed papillary thyroid carcinoma in the USA is approximately 5 per 100,000.² It is also the tumour most commonly encountered in patients with a history of prior head and neck radiation, in children, and as an incidental finding

at autopsy. Papillary carcinoma is multicentric and multifocal in nature and has an indolent course that may last decades.² In the older age group, after 40 years in men and 50 in women, these tumours may exhibit more aggressive behaviour for unknown reasons.^{3,4}

In accordance with the world literature, our study showed a female preponderance, with 42 males and 122 females ($p < 0.001$). Peak age of incidence was in the 3rd and 4th decades of life, the commonest presentation being an obvious anterior neck swelling. Other presentations included the presence of palpable neck lymph nodes and, in a few cases, the patients presented with cervical lymphadenopathy without primary thyroid swelling. These were initially suspected to have tumours of the throat and oral cavity. A diagnosis was made after FNAC of these enlarged lymph and histopathological findings. The biological behaviour of all tumours with papillary areas seen on histopathology correlated with that of papillary carcinoma, irrespective of the extent of papillary differentiation nodes.

Papillary carcinoma, although sometimes of the pure type, more commonly presents as an admixture with follicular elements. Long-term follow-up of the patients indicated that there was a good correlation between the biological behaviour of the tumours, if papillary areas, no matter to what extent are seen in the histopathological specimen.³ There are certain variants of papillary carcinoma that have been shown to be more aggressive clinically.^{5,6} These are the tall cell variant, columnar variant and diffuse sclerosing variant.

Not infrequently, papillary carcinoma remains occult and the first sign of the disease is the metastatic enlargement of cervical lymph nodes, as was seen in some of our patients. Papillary carcinomas are well known for their long periods of indolent growth and their propensity to metastasize to lymph nodes, particularly in the neck. Many appear as asymptomatic neck nodes for months to

Table 4. Results of recurrence in treated papillary carcinoma in Government. General Hospital and the Cancer Institute (1994 – 1998)

Surgery	Recurrence			
	<i>n</i>	Thyroid	Lymph node	Distant metastasis
Total thyroidectomy	220	10	5	3
Total thyroidectomy and neck node dissection	132	8	1	2
Hemithyroidectomy	76	13	5	2

Table 5. Frequency of thyroid cancers in the two regions

Place	Total no. of patients	Percentage
Coastal	334	78.03%
Inland	94	21.97%

years before being brought to clinical attention. In our study, nine cases presented with only neck node enlargement with no clinical evidence of thyroid nodules.

The multicentricity and intrathyroidal lymphatic spread of these lesions mean that speciality endocrine centres favour "total thyroidectomy" as the surgery of choice.^{7,8} Hemithyroidectomy in the presence of uni-lobular nodular occurrence of this tumour has been evaluated in several studies. Many of these studies have shown a higher incidence of residual tumour and recurrence.^{9,10} In our study, conservative surgery gave rise to a high rate of recurrence which adversely affected survival (Table 4).

We found that found a high incidence of papillary carcinoma was found in those patients who resided in the coastal regions, compared to those who lived inland (Table 3). The iodine content in the water and soil in the coastal areas was found to be sufficiency high more than 50 g/L, compared to inland regions, in which it varied from 1–30 g/L.

CONCLUSION

Papillary carcinoma of the thyroid is defined as a malignant epithelial tumour showing evidence of follicular cell differentiation, and characterized by the formation of papillary projections and distinctive nuclear changes. The most common thyroid malignancy, papillary thyroid carcinoma constitutes 50%–90% of differentiated

follicular derived thyroid cancers world-wide. In our study it constituted to about 78% of total incident cases during the study period.

These tumours are multifocal within the gland in about 75% of the cases, either due to a multicentric origin or intraglandular lymphatic metastasis.² They are slow growing and indolent, spreading locally in an infiltrative manner and usually metastasize via lymphatics to regional nodes. Lymph node metastasis occurs in about 25%–50% of cases at initial presentation, but this did not significantly influence survival. Bone metastasis occurred rarely.

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